

from the group consisting of choice of components to be used within said environment, choice of locations for said components with said environment, and orientation of said components at said locations;

AI a server computer or computers for running a computer program which generates said computer generated model;

at least one portable computer which acts as a client to said server, said at least one portable computer can download or store at least a portion of said computer generated model from said server to said portable computer for displaying either or both said three dimensional representation of (A) or said representation of (B); and

a display associated with said portable computer for displaying either or both said three dimensional representation of (A) or said representation and said performance prediction results of (B).

CONT 52. The computerized system of claim 51 further comprising a measurement device for measuring performance measurements or metrics within said physical environment or providing computation feedback associated with said portable computer, and for inputting performance measurements or metrics into at least said portion of said computer generated model in said portable computer.

53. The computerized system of claim 52 wherein said measurement device is connected to or interfaceable with said portable computer.

54. The computerized system of claim 52 further comprising an uploading device for uploading said performance measurements or metrics from said portable computer to said server or another client.

55. The computerized system of claim 54 further comprising a device for updating, logging, storing or archiving at said server the performance measurements or metrics from said uploading device.

56. The computerized system of claim 54 wherein said at least one portable

computer downloads at least an updated portion of said computer generated model from said server to said portable computer.

AI 57. The computerized system of claim 54 wherein said server or said at least one portable computer can transmit either or both predicted or measured performance measurements or metrics.

58. The computerized system claim 51 wherein said at least one portable computer comprises an input device for inputting changes to at least a portion of said computer generated model.

59. The computerized system of claim 58 further comprising an editor for editing said changes.

CONT 60. The computerized system of claim 58 wherein said at least one portable computer performs at least one of a) performance predictions, b) performance analysis or comparisons of measured or predicted data, c) analysis of cost data of components or network infrastructure, and determination of locations of physical objects or equipment.

61. The computerized system of claim 58 further comprising an uploading device for uploading changes to said server or servers or to another portable computer.

62. The computerized system of claim 58 further comprising at least one of a display or storage device for displaying or storing, respectively, said changes at either said server or said portable computer or said another portable computer.

63. The computerized system of claim 54 wherein said downloading and said uploading operate in real time or near real time.

64. The computerized system of claim 54 wherein communication of simulation or prediction or measurement data occurs through one of a docking cradle

connection, a wireless connection, a wired connection, and via electronic media.

AI 65. The computerized system of claim 52 wherein said at least one portable computer includes a plurality of portable computers, and wherein either or both predicted or measured performance measurements or metrics may be transmitted between said server or servers and said plurality of portable computers, and said computer generated model is updated based on said predicted or measurement performance measurements or metrics.

66. The computerized system of claim 51 wherein said portable computer or portable computers are each a hand held device.

67. The computerized system of claim 51 wherein said communication network components are maintained in a bill of materials.

68. The computerized system of claim 51 wherein a cost of a communication network component may be tracked, shared, revised, or substituted.

CONT 69. The computerized system of claim 51 wherein a performance attribute of a communication network component may be tracked, shared, revised or substituted.

70. The computerized system of claim 51 wherein a maintenance record may be tracked, shared, revised or substituted.

71. The computerized system of claim 51 wherein a location of a communication network component may be tracked, shared, revised or substituted.

72. The computerized system of claim 51 wherein a three dimensional representation is provided from said computer generated model, and said three dimensional representation is represented as a collection of two dimensional representations.

73. The computerized system of claim 51 wherein said computer generated model includes at least one floor plan of a building.

74. The computerized system of claim 73 wherein said computer generated model includes a plurality of floor plans for one or more floors for one or more buildings.

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75. The computerized system of claim 74 further comprising a selecting device which operates with said server or servers or said at least one portable computer which selects one or more floor plans and one or more buildings for display, measurement or prediction operations.

76. The computerized system of claim 51 wherein components represented in said computer generated model are selected from the group consisting of base stations, base station controllers, amplifiers, attenuators, antennas, coaxial cabling, fiber optic cabling, splitters, repeaters, transducers, converters, couplers, leaky feeder cables, hubs, switches, routers, firewalls, power distribution lines, copper wiring, twisted pair cabling and wireless access points.

CONT  
77. The computerized system of claim 51 wherein said communications network includes wireless communication devices.

78. The computerized system of claim 51 wherein said physical environment includes an outdoor area having three dimensional topology, and said display displays said three dimensional topology.

79. The computerized system of claim 51 further comprising an identifier for identifying a location of said at least one portable computer within said physical environment.

80. The computerized system of claim 79 wherein said identifier includes a position tracking or locationing device.

81. The computerized system of claim 51 wherein said representation displayed on said display is three dimensional.

82. The computerized system of claim 81 wherein said representation is represented as a series of two dimensional representations.

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83. The computerized system of claim 51 further comprising an un-manned measurement device for making measurements in said physical environment and means for uploading said measurements to said server for updating said computer generated model.

84. The computerized system of claim 51 wherein said computer generated model includes at least one of objects in a building or their locations, communications component data and their location, building information or properties, radio propagation properties, bill of materials data, environmental data, cost data, and asset management data.

CONT  
85. A method for designing, deploying, modifying or maintaining a communications network, comprising:

providing a computer generated model of a physical environment in which said communications network is or will be deployed, said computer generated model performs at least one of

(A) providing a three-dimensional representation of locations of components within said physical environment, or

(B) providing a representation of locations of components within said physical environment, and wherein said computer generated model provides for performance prediction of said communications network based on factors selected from the group consisting of choice of components to be used within said environment, choice of locations for said components with said environment, and orientation of said components at said locations;

generating said computer generated model with a server computer or computers;

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at least one portable computer which acts as a client to said server;  
downloading or storing at least a portion of said computer generated model from said server computer or computers to at least one portable computer which acts as a client to said server; and  
displaying either or both said three dimensional representation of (A) or said representation and said performance prediction results of (B) on said at least one portable computer.

86. The method of claim 85 wherein said step of displaying is performed on said server computer or computers.

87. The method of claim 85 further comprising the steps of  
measuring performance measurements or metrics within said physical environment or providing computation feedback associated with said portable computer, and  
inputting performance measurements or metrics into at least said portion of said computer generated model in said portable computer.

CONT

88. The method of claim 87 further comprising the step of connecting or interfacing a measurement device with said portable computer.

89. The method of claim 85 further comprising the step of uploading said performance measurements or metrics from said portable computer to said server or another client.

90. The method of claim 89 further comprising at least one of the steps of updating, logging, storing or archiving at said server the performance measurements or metrics.

91. The method of claim 85 wherein said downloading step downloads at least an updated portion of said computer generated model from said server to said portable computer.

92. The method of claim 89 wherein either or both said steps of uploading and downloading transmits either or both predicted or measured performance measurements or metrics to or from said server or said at least one portable computer.

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93. The method of claim 85 further comprising the step of inputting changes to at least a portion of said computer generated model with said at least one portable computer.

94. The method of claim 93 further comprising the step of editing said changes.

95. The method of claim 93 further comprising the step of performing, at said at least one portable computer, at least one of performance predictions, performance analysis or comparisons of measured or predicted data, analysis of cost data of components or network infrastructure, and determination of locations of physical objects or equipment.

CONT

96. The method of claim 93 further comprising the step of uploading changes to said server or servers or to another portable computer.

97. The method of claim 96 further comprising the step of displaying or storing said changes at either said server or said portable computer or said another portable computer.

98. The method of claim 89 wherein said steps of downloading and uploading operate in real time or near real time.

99. The method of claim 85 wherein communication of simulation or prediction or measurement data occurs through a docking cradle connection, a wireless connection, a wired connection, or via electronic media.

100. The method of claim 85 wherein said at least one portable computer includes

a plurality of portable computers, and wherein either or both predicted or measured performance measurements or metrics may be transmitted between said server or servers and said plurality of portable computers, and said computer generated model is updated based on said predicted or measurement performance measurements or metrics.

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101. The method of claim 85 wherein said portable computer or portable computers are each a hand held device.

102. The method of claim 85 further comprising the step of maintaining said communication network components in a bill of materials.

103. The method of claim 85 further comprising at least one of the step of tracking, sharing, revising, and substituting a cost of a communication network component in said computer generated model with either or both said server computer or computers and said at least one portable computer.

CONT

104. The method of claim 85 further comprising at least one of the step of tracking, sharing, revising, and substituting a performance attribute of a communication network component in said computer generated model with either or both said server computer or computers and said at least one portable computer.

105. The method of claim 85 further comprising the step of tracking, sharing, revising, and substituting a location of a communication network component in said computer generated model with either or both said server computer or computers and said at least one portable computer.

106. The method of claim 85 further comprising at least one of the step of tracking, sharing, revising, and substituting a maintenance record in said computer generated model with either or both said server computer or computers and said at least one portable computer.



107. The method of claim 85 further comprising the step of representing a three dimensional representation of said physical environment from a collection of two dimensional representations.

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108. The method of claim 85 wherein said computer generated model includes at least one floor plan of a building.

109. The method of claim 108 wherein said computer generated model includes a plurality of floor plans for one or more floors for one or more buildings.

110. The method of claim 109 further comprising the step of selecting one or more floor plans and one or more buildings for display, measurement or prediction operations with either or both said server computer or computers or said at least one portable computer.

CONT

111. The method of claim 85 wherein components represented in said computer generated model are selected from the group consisting of base stations, base station controllers, amplifiers, attenuators, antennas, coaxial cabling, fiber optic cabling, splitters, repeaters, transducers, converters, couplers, leaky feeder cables, hubs, switches, routers, firewalls, power distribution lines, copper wiring, twisted pair cabling and wireless access points.

112. The method of claim 85 wherein said communications network includes wireless communication devices.

113. The method of claim 85 wherein said physical environment includes an outdoor area having three dimensional topology, and further comprising the step of displaying said three dimensional topology.

114. The method of claim 85 further comprising the step of identifying a location of said at least one portable computer within said physical environment.